**IN THE CLAIMS:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (canceled)

2. (previously presented) The method of claim 10 wherein the modulation is performed by a phase modulator driven by a sinusoidal RF voltage.

3. (previously presented) The method of claim 10 wherein the modulation is performed by a phase modulator driven by a train of square pulses.

4. (previously presented) The method of claim 10 wherein the input optical signal is provided having a polarization oriented at a predetermined angle such that the polarization of successive optical bits of the transmitted APol-DPSK signal are substantially orthogonal.

5. (previously presented) The method of claim 10 wherein the modulation is performed by a Mach-Zehnder modulator including a polarization rotation device in at least one arm.

6. (original) The method of claim 5 wherein the polarization rotation device is a half-wave plate.

7. (previously presented) The method of claim 5 wherein at least one arm of the Mach-Zehnder modulator is driven by a sinusoidal RF voltage.

8. (previously presented) The method of claim 5 wherein at least one arm of the Mach-Zehnder modulator is driven by a train of square pulses running at half the bit rate.

9. (previously presented) A method of APol-PSK transmission comprising the steps of:

providing a coherently polarized optical source signal to the arms of a Mach-Zehnder modulator having a polarization rotation device in at least one arm and configured to provide simultaneous polarization alternation and optical data encoding by phase shift keying;

encoding the optical source signal by phase shift keying to generate a phase encoded signal, wherein said phase shift keying is performed by driving the Mach-Zehnder modulator with an electronic data signal; and

alternating the polarization of every other bit simultaneous with the step of encoding the optical source signal to produce an APol-PSK signal, wherein said alternating is performed by the Mach-Zehnder modulator.

10. (previously presented) A method for APol-DPSK transmission comprising:

modulating an input optical signal according to a precoded electronic data signal by differential phase shift keying between two optical bits separated by an even number of bit periods to generate an encoded optical signal;

alternating the polarization of the encoded optical signal using a modulator such that successive optical bits have substantially orthogonal polarizations to generate an APol-DPSK signal; and

demodulating the APol-DPSK signal using an even bit delay line interferometer.

11. (canceled)

12. (previously presented) A method of APol-DPSK transmission comprising:

modulating an optical signal according to a precoded electronic data signal by differential phase shift keying between two optical bits separated by an even number of bit periods and performing polarization alternating such that successive optical bits have substantially orthogonal polarizations to generate an APol-DPSK signal;

wherein said modulating and said polarization alternating are performed simultaneously by a Mach-Zehnder modulator including a polarization rotation device in at least one arm, and

wherein input signals to both arms of the Mach-Zehnder modulator have polarizations that are the same.

13. (original) The method of claim 12 wherein the polarization rotation device is a half-wave plate.

14. (original) The method of claim 12 further comprising demodulating the APol-DPSK signal using an even bit delay line interferometer.

15. (canceled)

16. (canceled)

17. (canceled)

18. (canceled)

19. (previously presented) The transmitter of claim 26 wherein at least one arm of the Mach-Zehnder modulator is driven by a sinusoidal RF voltage.

20. (previously presented) The transmitter of claim 26 wherein at least one arm of the Mach-Zehnder modulator is driven by a train of square pulses running at half the bit rate.

21. (previously presented) The transmitter of claim 26 wherein the Mach-Zehnder modulator comprises two complementary output ports, and wherein the transmitter further comprises a polarization beam combiner for combining outputs from the two output ports of the Mach-Zehnder modulator.

22. (previously presented) The transmitter of claim 21 wherein at least one arm of the Mach-Zehnder modulator is driven by a sinusoidal RF voltage.

23. (previously presented) The transmitter of claim 21 wherein at least one arm of the Mach-Zehnder modulator is driven by a train of square pulses running at half the bit rate.

24. (canceled)

25. (previously presented) An optical transmitter for APol-PSK transmission comprising:

an optical source;

a Mach-Zehnder (MZ) modulator device optically coupled to the optical source having a polarization rotation device in one arm; and

drive circuitry coupled to the MZ modulator device to drive the MZ modulator to simultaneously provide polarization alternation and optical data encoding of an optical signal using phase shift keying to generate an APol-PSK signal;

wherein input signals to both arms of the Mach-Zehnder modulator have polarizations that are the same.

26. (previously presented) An optical transmitter for APol-DPSK transmission comprising:

an optical source;

a precoder;

a Mach-Zehnder (MZ) modulator device optically coupled to the optical source having a half-wave plate in one arm; wherein input signals to both arms of the Mach-Zehnder modulator have polarizations that are the same; and

drive circuitry coupled to the MZ modulator device to drive the MZ modulator using a precoded data signal from the precoder to simultaneously provide polarization alternation and optical data encoding of an optical signal using differential phase shift

keying between two optical bits separated by an even number of bit periods to generate an APol-DPSK signal.

27. (canceled)

28. (previously presented) An optical transmission system for APol-PSK transmission comprising:

an optical source,

a modulator means having a polarization rotation device to provide simultaneous polarization alternation and optical data encoding by phase shift keying to generate an APol-PSK signal.

29. (previously presented) An optical transmission system for APol-DPSK transmission comprising:

an optical source;

a precoder device for precoding an electronic data signal;

an optical phase-shift-keying data modulator optically coupled to the optical source and driven by a precoded electronic data signal from the precoder device to produce an optical DPSK signal wherein electronic data to be transmitted is optically encoded by the data modulator as differential phase shift keying between two optical bits separated by an even number of bit periods;

a polarization alternator optically coupled to the data modulator to provide polarization alternation of the output of the data modulator to produce an APol-DPSK signal; and

a demodulator comprising an even bit delay line interferometer.

30-32. (canceled)